Converting Between Fractions and Recurring Decimals

Mark Scheme

1. $\frac{29}{99}$ 2

$100x = 29.\dot{2}\dot{9}$
$x = 0.\dot{2}\dot{9}$
$99x = 29$

M1 for $29.\dot{2}\dot{9} - 0.\dot{2}\dot{9}$ *or for* $99x = 29$
A1 cao

[2]

2. (a) 0.2727… 1

B1 for 2.27 recurring or 0.2727…. oe or 0.273

(b) eg $x = 0.3939\ldots$ so $100x = 39.3939\ldots$
$99x = 39$
so $x = \frac{39}{99} = \frac{13}{33}$ 3

M1 for 100x = 39.39…
M1 dep for subtraction of both sides
A1 for $\frac{13}{33}$ *from correct proof*

Alternative method
M1 for 13.000 ÷ 33
M1 for remainders 31 and 13
A1 for 0.39 recurring
SC:B1 for $\frac{39}{99}$

[4]

3. (a) $\frac{3}{11}$ 3

Let $x = 0.2727\ldots$
$100x = 27.2727\ldots$
$99x = 27$

M1 for 100x – x = 27.27… – 0.27…
A1 for 27/99 oe
A1 for 3/11 cao

(b) $y = \frac{x}{99}$ 2

Let $y = 0.0x\ 0x\ldots$
$100y = x.0\ x\ 0\ x\ldots$
$99y = x$

M1 for 100y – y = x.0x… – 0.0x… oe
A1 for completion of proof

[5]

4. (a) $\frac{36}{99}$ oe 2

$x = 0.3636..$ $100x = 36.3636..$

M1 for 36.3636… – 0.3636 …or 99x = 36

A1 for $\frac{36}{99}$ *oe*

(b) $2\ \frac{3}{22}$ oe 3

For example $y = 0.13636…$

$10y = 1.3636…$

$1000y = 136.3636…$

$990y = 135$ $y = \frac{135}{990}$

M1 for a clear fully correct method using either $2.1\dot{3}\dot{6}$ *or* $0.1\dot{3}\dot{6}$ *including subtraction to ay = b where at least one of a or b is correct*

A2 for $\frac{47}{22}$ *or* $2\ \frac{3}{22}$

[A1 for any fraction equivalent to $\frac{47}{22}$ *eg.* $\frac{2115}{990}$ *]*

Alt method:

M1 for $2\ \frac{1}{10}$ *+ (ans(i)/10)*

A2 for $\frac{47}{22}$ *or* $2\frac{3}{22}$

[A1 for any fraction equivalent to $\frac{47}{22}$ *eg.* $\frac{2115}{990}$ *]*

[5]

5. $\frac{1}{2}+\frac{8}{110}$

$\frac{63}{110}$ oe 2

M1 for $\frac{1}{2}+\left(\frac{8}{11}\div 10\right)$ *OR* $\left(5+\frac{8}{11}\right)\div 10$

A1 cao

Alternative method

M1 for $0.5\dot{7}\dot{2}$ *= 0.57272...*

A1 cao

[2]

6. $x = 0.32828…$

$100x = 32.828…$

$99x = 32.5$

$\frac{65}{198}$ 3

M1 for 0.32828…

M1 (dep) for attempt to subtract two recurring decimals that would result in a correct terminating decimal(e.g 328.28…–3.28… or 32.828…–0.328…)

A1 for $\frac{65}{198}$ *oe with numerator and denominator both integer* *[3]*